

Claims

1.

1 A two-piece plastic closure that comprises:

2 a plastic closure shell including a base wall and a peripheral skirt with internal
3 means for securing the closure over a container finish, and

4 a plastic disk loosely retained within said shell parallel to but separate from said
5 base wall, and a resilient sealing liner molded in situ on said disk for sealing engagement with
6 a container finish.

2.

1 The closure set forth in claim 1 wherein said disk includes an annular ring
2 underlying said liner on a side of said disk remote from said base wall, said ring being spaced
3 from said skirt for urging said liner against a radially inner edge of a container finish when said
4 closure is secured to the container finish.

3.

1 The closure set forth in claim 2 wherein said disk comprises a flat base form while
2 said annular ring extends.

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4.

1 The closure set forth in claim 3 wherein said ring has an S-shaped radially
2 outwardly facing surface, including a rounded convex portion that extends from an axial edge
3 of said ring and a rounded concave portion that extends from said convex portion to a flat axially
4 facing surface of said base.

5.

1 The closure set forth in claim 4 wherein said disk base has a central portion within
2 said ring and a peripheral portion outside of said ring, said central and peripheral portions being
3 of identical thickness.

6.

1 The closure set forth in claim 5 wherein said liner is of uniform thickness over
2 said central portion, said ring and said peripheral portion of said disk.

7.

1 The closure set forth in claim 6 wherein said liner includes a barrier resin material
2 to resist migration of gases, water vapor or flavorants through said liner.

8.

1 The closure set forth in claim 5 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

9.

1 The closure set forth in claim 3 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of a container finish when said
4 closure is secured to the container finish.

10.

1 The closure set forth in claim 9 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

11.

1 The closure set forth in claim 10 wherein thickness of said liner on said radially
2 inwardly directed surface of said rib is less than the thickness of said liner on said disk base and
3 said ring.

12.

1 The closure set forth in claim 10 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

13.

1 The closure set forth in claim 1 wherein said closure shell includes a bead
2 extending radially inwardly from said skirt at a position spaced from said base wall, and wherein
3 said disk and liner are loosely captured between said bead and said base wall.

14.

1 The closure set forth in claim 13 wherein said closure shell further includes a
2 tamper-indicating band connected by frangible means to a lower edge of said skirt for abutment
3 with a stop on the container finish, spacing between said bead and said base wall being such that
4 said band abuts the stop and fractures said frangible means before said bead lifts said disk and
5 liner from sealing engagement with the container finish.

15.

1 The closure set forth in claim 1 wherein said liner includes a barrier material
2 against migration of gases, water vapor or flavorants through said liner.

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16.

1 A plastic closure that comprises:

2 a plastic closure shell including a base wall, and a peripheral skirt with an internal
3 thread for securing the closure to a container finish and an internal bead adjacent to but spaced
4 from said base wall,

5 a plastic disk loosely retained by said bead parallel to but separate from said base
6 wall, said disk including a flat base with a peripheral portion captured between said bead and said
7 base wall and an annular ring extending axially from said base adjacent to but spaced from said
8 periphery, and

9 a resilient liner molded onto said disk covering at least a central portion of said
10 base and said ring, said ring urging said liner into sealing engagement with a radially inner edge
11 of a container finish when said closure is secured to the container finish.

17.

1 The closure set forth in claim 16 wherein said liner is molded in situ onto said disk
2 within said closure.

18.

1 The closure set forth in claim 17 wherein said ring has an S-shaped radially
2 outwardly facing surface, including a rounded convex portion that extends from an axial edge
3 of said ring and a rounded concave portion that extends from said convex portion to a flat axially
4 facing surface of said base.

19.

1 The closure set forth in claim 18 wherein said liner includes a barrier resin
2 material to resist migration of gases, water vapor or flavorants through said liner.

20.

1 The closure set forth in claim 16 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

21.

1 The closure set forth in claim 16 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of a container finish when said
4 closure is secured to the container finish.

22.

1 The closure set forth in claim 21 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 inwardly outwardly from said base of said disk.

23.

1 The closure set forth in claim 22 wherein thickness of said liner on said radially
2 inwardly directed surface of said rib is less than the thickness of said liner on said disk base and
said ring.

24.

1 The closure set forth in claim 22 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

25.

1 A plastic closure that comprises:

2 a plastic shell including a base wall and a peripheral skirt with internal means for
3 securement to a container finish,

4 a resilient sealing liner for urging by said base wall into sealing engagement with
5 a container finish upon securement of said skirt to the finish, and

6 an annular ring underlying said liner and spaced radially inwardly from said skirt
7 for urging said liner into sealing engagement with a radially inner edge of the container finish.

26.

1 The closure set forth in claim 25 wherein said ring is on said base wall.

27.

1 The closure set forth in claim 26 wherein said closure shell further includes a
2 shoulder that extends radially inwardly from said skirt adjacent to said base wall, said liner
3 extending along a radially inwardly directed surface of said shoulder for sealing engagement with
4 an outer edge of a container finish when the closure is secured to the container finish.

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28.

1 The closure set forth in claim 27 wherein said radially inwardly directed surface
is a conical surface that is angled radially outwardly from said base wall.

29.

1 The closure set forth in claim 26 wherein said closure shell further includes an
2 annular wall that extends axially from said base wall adjacent to said skirt, said liner extending
3 along a radially inwardly directed surface of said annular wall for sealing engagement with an
4 outer edge of a container finish when said closure is secured to the container finish.

30.

1 The closure set forth in claim 29 wherein said radially inwardly directed surface
2 is a conical surface that is angled radially outwardly from said base wall.

31.

1 The closure set forth in claim 25 wherein said ring is on a plastic disk loosely
2 retained within said shell parallel to but separate from said base wall.

32.

1 The closure set forth in claim 31 wherein said disk comprises a flat base from
2 which said annular ring extends.

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33.

1 The closure set forth in claim 32 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said liner.

34.

1 The closure set forth in claim 32 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of the container finish when said
4 closure is secured to the container finish.

35.

1 The closure set forth in claim 34 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

36.

1 The closure set forth in claim 35 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

37.

1 The closure set forth in claim 25 wherein said liner includes a barrier resin
material to resist migration of gases, water vapor or flavorants through said liner.

38.

1 A closure and container package that comprises:

2 a container including a body and a finish with an external thread, and

3 a plastic closure that includes:

4 a plastic closure shell including a base wall, and a peripheral skirt with an internal
5 thread securing the closure to a said container finish and an internal bead adjacent to but spaced
6 from said base wall,

7 a plastic disk retained by said bead parallel to but separate from said base wall,
8 said disk including a flat base with a peripheral portion captured between said bead and said base
9 wall and an annular ring extending axially from said base adjacent to but spaced from said
10 periphery, and

11 a resilient liner molded onto said disk covering at least a central portion of said
12 base and said ring, said ring urging said liner into sealing engagement with a radially inner edge
13 of said container finish.

39.

1 The package set forth in claim 38 wherein said liner is molded in situ onto said
2 disk within said closure.

40.

1 The package set forth in claim 39 wherein said ring has an S-shaped radially
2 outwardly facing surface, including a rounded convex portion that extends from an axial edge
3 of said ring and a rounded concave portion that extends from said convex portion to a flat axially
facing surface of said base.

41.

1 The package set forth in claim 40 wherein said liner includes a barrier resin
2 material to resist migration of gases, water vapor or flavorants through said liner.

42.

1 The package set forth in claim 38 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

43.

1 The package set forth in claim 38 wherein said disk further includes an annular
2 rib around a radially outer edge of said disk base extending away from said base wall and
3 underlying said liner for engaging said liner against a radially outer edge of said container finish.

44.

1 The package set forth in claim 43 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

45.

1 The package set forth in claim 44 wherein thickness of said liner on said radially
2 inwardly directed surface of said rib is less than the thickness of said liner on said disk base and
3 said ring.

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46.

1 The package set forth in claim 44 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

47.

1 A method of making a two-piece plastic closure that comprises:

2 (a) providing a plastic closure shell that includes a base wall and a peripheral
3 skirt with internal means for securing the closure to a container finish,

4 (b) placing a plastic disk within said closure shell against said base wall, and

5 (c) compression molding a resilient plastic liner in situ onto said disk for sealing
6 engagement with a container finish.

48.

1 The method set forth in claim 47 wherein said step (a) includes providing an
2 internal bead around said skirt adjacent to but spaced from said base wall, and wherein said step
3 (b) includes placing said disk within said shell such that a periphery of said disk is loosely
4 captured between said bead and said base wall.

49.

1 The method set forth in claim 48 wherein said disk has a central portion adjacent
2 to said base wall.

50.

1 The method set forth in claim 49 wherein said step (c) comprises compression
2 molding a liner over said disk, including said central portion, which includes a barrier resin to
3 said migration of gases, water vapor or flavorants through said liner.

51.

1 The method set forth in claim 48 wherein said disk includes an annular ring
2 underlying said liner on a side of said disk remote from said base wall, said ring being spaced
3 from said skirt for urging said liner against a radially inner edge of a container finish when said
4 closure is secured to the container finish.

52.

1 The method set forth in claim 51 wherein said ring has an S-shaped radially
2 outwardly facing surface, including a rounded convex portion that extends from an axial edge
3 of said ring and a rounded concave portion that extends from said convex portion to a flat axially
4 facing surface of said base.

53.

1 The method set forth in claim 52 wherein said disk base has a central portion
2 within said ring and a peripheral portion outside of said ring, said central and peripheral portions
3 being of identical thickness.

54.

1 The method set forth in claim 53 wherein said liner is of uniform thickness over
2 said central portion, said ring and said peripheral portion of said disk.

55.

1 The method set forth in claim 53 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

56.

1 The method set forth in claim 51 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of the container finish when said
4 closure is secured to the container finish.

57.

1 The method set forth in claim 56 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

58.

1 The method set forth in claim 57 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
annular rib has a concave radially outwardly directed surface portion received over said bead.

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